UNITED STATES PATENT AND TRADEMARK OFFICE

	Examiner:	MERCIER, Melissa S. - Art Unit: 1615
Re:	Application of:	PODHAJNY, Richard M.
	Serial No.:	10/765,023
	Filed:	January 26, 2004
	For:	**ANTI-MICROBIAL PACKAGING MATERIALS AND METHODS FOR MAKING THE SAME**
	Confirmation No.	1299

DECLARATION UNDER 37 C.F.R. § 1.132

VIA EFS-Web

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I, Dr. Jose M. Lorenzo, declare and state:

1. My educational background includes a Ph.D. in Chemical Engineering from the City University of New York. After completing my doctorate in 2001, I worked for 3½ years as a Senior Research Engineer at Air Products and Chemicals, designing and evaluating environmentally friendly chemical products and processes. Then, I worked for two years as a Surface Scientist at Elementis Specialties designing and evaluating polymeric dispersants for pigments. My areas of expertise are interfacial and colloidal physical chemistry, chemical product development, and chemical process engineering.

2. I am currently the Manager of New Product Development at No-Tox Products, a division of Colorcon, Inc, a company related to the assignee of the present application.

3. My expert opinions and conclusions, as set forth in this Declaration, are based upon my familiarity with the invention disclosed by the present application, together with my 1 year of expertise and research in the field of antimicrobial coatings for packaging materials.

4. I have read and understand the March 14, 2008 Office Action in the present application. In particular, I understand that the Examiner believes that the invention described in claims 1, 2, 7, 8, 14-18 and 29 would have been obvious to one of ordinary skill in the art at the time the invention was made based on the teachings of Yokota (U.S. 5,783,570). In addition, I understand that the Examiner believes that the invention described in claims 1, 2, 7-12, 14-19, 21-25 and 29 would have been obvious to one of ordinary skill in the art at the time the invention was made based on the teachings of Sakai (U.S. 5,280,054). I have read these references and understand their disclosures.

5. I believe that I am well-qualified as an expert to analyze Yokota and Sakai. I further believe that I am well-qualified as an expert to render an opinion concerning what one of ordinary skill in the art would be taught by Yokota and Sakai.

6. In my opinion, the invention described in the claims presented herewith in the present application would not have been obvious based on the teachings of either Yokota or Sakai. As such, the claimed printable zeolite-containing dispersion, the method of printing the anti-microbial dispersion, as well as the method of rendering a substrate anti-microbial or otherwise more resistant to bacteria would not be obvious in view of either of these references. The reasons for my opinion are set forth in the following paragraphs.

7. Anti-microbial packaging is of increasing importance in, for example, the food industry. It allows manufacturers to distribute products with longer shelf lives. Incorporating anti-microbial agents, such as zeolites, into the raw materials that form the packaging material has been suggested. However, this technique buries much of the anti-microbial agent within the packaging material. This obviously decreases the anti-microbial effectiveness of the zeolites. A limited amount of the anti-microbial agent reaches the exposed surface of the packaging material where it can have its desired effect, while the remainder is mostly wasted within the interior of the packaging material.

8. Coating an anti-microbial dispersion onto the surface of a packaging material prevents the material waste described in the previous paragraph. A coating can be delivered using several techniques, as for example, spray or shower coatings, dipping, brushing, or printing. The relevant/suitable printing techniques include rotogravure, flexography, offset, lithography, and inkjet. We focus on the printing techniques only because (1) printers or converters of packaging materials for food products use them every day, (2) the printing techniques allow applying the dispersions onto the surface of the packaging material at the desired thickness and image pattern, without the need of more delivery and metering equipment, and (3) when the anti-microbial dispersion is applied using one of the relevant printing techniques, the packaging material can be inked using the same printing unit, as for example, some printing units have 5 stations, the first 4 stations apply the process ink colors (black, red, blue, and yellow) and the 5th station can be used to

apply the anti-microbial dispersion. If the converters are forced to use non-printing techniques (spray or shower coatings, dipping, or brushing, etc), they will need to buy more equipment that most likely is not even available, learn how to use the equipment, design the equipment and the process in order to meet the target settings, and obtain stable fluids with the required physicochemical properties. The claims under consideration herein are directed to printable dispersions and methods of printing the dispersions onto various substrates.

9. Yokota and Sakai do not make mention of the physicochemical properties that are required by the relevant printing techniques. Polymers and zeolites cannot be arbitrarily combined with the expectation of producing a stable dispersion with a desired set of physicochemical properties in order to be adequately printed onto a material using one of the relevant printing techniques. In order to produce a stable dispersion and to prevent problems such as precipitation, many properties must be carefully considered. Polymeric dispersions with particles are highly non-linear systems and small changes in concentrations can result in dramatic changes in physical properties, including phase transitions.

10. Applicant has discovered zeolite-containing dispersions that can be effectively employed to render a material anti-microbial or otherwise more resistant to bacteria using the relevant printing techniques. As recited in claim 1 of the present application, the dispersion includes a polymer having an acid number of less than about 200. The dispersion of claim 1 of the present application is described as especially suitable for printing. Printing the dispersions of the invention onto the surface provides a higher amount of anti-microbial zeolites at the surface of the material which increases anti-microbial effectiveness with less buried waste.

11. I am familiar with the test data presented in the examples of the current application. This test data demonstrates the significance of printing a dispersion having an acid number of less than about 200. As further discussed below, printing conventional dispersions with acid numbers above 200 is inadequate, in part because a complex is formed that precipitates and causes the viscosity of the dispersion to increase to a point where the dispersion cannot be printed. The examples of the application therefore demonstrate the criticality of printing a dispersion having a polymer with the acid number of claim 1.

12. As summarized in the following table based on the data in Example 5 of the application, dispersions having polymers with acid numbers above 200 could not be satisfactorily printed. A dispersion having a Joncryl 678 resin with an acid number of 215 became unstable because the viscosity of the solution increased and eventually caused settling of the resin as a metal complex. Settling was also observed when employing Joncryl DFC-3015 with an acid number of 240 and Joncryl DFC-3025 with an acid number of 220. It is believed that polymers with acid numbers above 200 cause precipitation due to the presence of high levels of dissolved metal ions.

13. In contrast to the aforementioned dispersions having polymers with acid numbers above 200, a dispersion having Joncryl 80 with an acid number of 60 did not settle. Similarly, settling was not observed when employing Joncryl DFC-3030 with an acid number of 64 or Joncryl DFC-3040 with an acid number of 55. The use of a polymer having an acid number less than about 200 contributes to the stability of the dispersion and its suitability for printing. This aspect of the present invention is not taught or suggested by Yokota or Sakai, and it is my opinion that the skilled artisan would not find it obvious to print a dispersion having a polymer with an acid number less than about 200 based on the teachings of Yokota and Sakai.

Resin	Acid Number	Printability
Joncryl 678	215	unstable, high viscosity, settling observed
Joncryl DFC-3015	240	immediate settling
Joncryl DFC-3025	220	immediate settling
Joncryl 80	60	no settling
Joncryl DFC-3030	64	no settling
Joncryl DFC-3040	55	no settling

14. The data presented in the table above demonstrates the criticality of printing a polymer having an acid number below 200. Yokota and Sakai do not recognize this criticality. Without knowledge of this important property, the skilled artisan would not be able to predict which polymers can be employed in a printable dispersion from the broad lists of Yokota and Sakai. The skilled artisan might simply assume that all of the polymers of Yokota and Sakai are suitable. However, all polymers are not printable as illustrated in the table above. The present invention therefore differs from a situation where a known variable is optimized to produce a desired result. Instead, applicant has discovered that the acid number of the polymer contributes to the stability, viscosity, and consequently the printability of the dispersion. Yokota and Sakai do not recognize the importance of the acid number and the skilled artisan would therefore not be motivated to optimize the same.

15. The table below lists the viscosity range required by each relevant printing technique. For printing, a dispersion must be stable and single phase.

Printing Process	Dispersion Viscosity (cP)
Lithographic	10,000 – 50,000
Letterpress	1,000 – 50,000
Screen	1,000 – 5,000
Flexographic	50 – 500
Rotogravure	30 – 200
Inkjet	2 - 20

16. In my opinion, it would not have been obvious based on the teachings of Yokota or Sakai to print a dispersion with a polymer having an acid number of less than about 200. Yokota and Sakai do not teach or suggest printing a dispersion, which differs from the coating methods of Yokota and Sakai for at least the reasons described above. The applicant did not merely select or optimize properties that were considered relevant by Yokota or Sakai. Rather, the applicant discovered that the acid number of the polymer determined the viscosity and stability of the dispersion, and consequently its printability. I believe that this discovery would not have been obvious to those skilled in the art based on Yokota and Sakai.

17. It is declared by undersigned that all statements made herein of undersigned's own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the U.S. Code; and that such willful false statements may jeopardize the validity of this Application or any patent issuing thereon.

José M. Lorenzo — 11 July 2008

Dr. Jose M. Lorenzo — Date